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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,512	05/25/2005	Jae-Hyun Kim	17172-006US1 OPP 050737 U	6483
26161 7590 02/21/2008 FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER LEE, SIN J	
			ART UNIT 1795	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/536,512	Applicant(s) KIM ET AL.	
	Examiner Sin J. Lee	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/6/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Due to newly cited prior arts, the following rejections are made non-final.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 1, 2 and 6-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Pavelcheck et al (US 6,767,689 B2).

Pavelcheck teaches (claims 1, 10 and 12 and col.11, lines 53-58) an antireflective composition comprising a resin having anthracene groups, a thermal acid generator, a crosslinker component and an organic solvent. Specifically, in his Example 1, Pavelcheck discloses a polymer of anthracene methyl methacrylate, methyl methacrylate and 2-hydroxyethyl methacrylate, which is the present polymer of Formula 3. Pavelchek also teaches the use of polyvinylphenols (an art-known light absorbing agent as well as present adhesivity enhancer of Formula 1) in the antireflective composition (see col.7, lines 13-17). In Pavelcheck, the antireflective composition is

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applied to a substrate and then cured (see col.10, lines 11-36). Then, a photoresist is applied over the surface of the antireflective composition. After the photoresist is exposed imagewise, the exposed photoresist layer is post-baked and then developed (see col.10, lines 36-63). The developed substrate is then etched (col.11, lines 8-15). Thus, Pavelcheck teaches present inventions of claims 1, 2 and 6-15.

5. Claims 16-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Hwang et al ("A Novel Organic Bottom Anti-Reflective Coating Material for 193 nm Excimer Laser Lithography", Polymer 41 (2000) pg.6691-6694).

Hwang teaches a bottom anti-reflective coating composition containing polyvinyl phenol (as a UV absorber), present crosslinking agent of Formula 2, and present thermal acid generator of Formula 4 (see abstract and Fig.1). Hwang's polyvinyl phenol also teaches present adhesivity enhancer of Formula 1 as well. In Hwang (see pg.6694), a resist film is prepared by spin-coating of photoresist solution on a BARC treated silicon wafer substrate followed by soft baking at 110°C for 90 s. Exposure is carried out on an ArF exposure tool and the film is baked again. After baking the wafer is then developed. Thus, Hwang teaches present inventions of claims 16-19.

6. Claims 16-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Jung et al (US 7,108,957 B2, which is equivalent to US 2004/0018346 A1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in

the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Jung teaches (see claims 1-7) an anti-reflective coating composition containing an organic solvent, a polyvinyl phenol polymer of present Chemical Formula 1 (as a light-absorbing agent), a thermal acid generator of present Chemical Formula 4 and a crosslinking agent of present Chemical Formula 2. The polyvinyl phenol polymer also teaches present adhesivity enhancer of claim 16. Thus, Jung teaches present inventions of claims 16-18. In col.5, lines 45-67, col.6, lines 1-13, Jung teaches a method for forming photoresist patterns comprising the steps of applying his anti-reflective coating composition onto the surface of a layer to be etched to form a coating, conducting a baking process on the coating to generate cross-linking to form an organic anti-reflective film, applying a photosensitive material onto the anti-reflective film to form a photoresist, exposing the photoresist to a light source to form an exposed photoresist, and developing the exposed photoresist to form desirable photoresist patterns. Thus, Jung teaches present inventions of claims 19-21.

7. Claims 16-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Jung et al (US 7,175,974 B2).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in

the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Jung teaches (see col.2, lines 65-67, col.3, lines 1-3, lines 36-67, col.4, lines 1-16, lines 28-45, lines 54-66) an anti-reflective coating composition containing an organic solvent, a polyvinyl phenol polymer of present Chemical Formula 1 (as a light-absorbing agent), a thermal acid generator of present Chemical Formula 4 and a crosslinking agent of present Chemical Formula 2. The polyvinyl phenol polymer also teaches present adhesivity enhancer of claim 16. Thus, Jung teaches present inventions of claims 16-18. In claims 1-3, Jung teaches a method for forming photoresist patterns comprising the steps of applying his anti-reflective coating composition onto the surface of a layer to be etched to form a coating, conducting a baking process on the coating to generate cross-linking to form an organic anti-reflective film, applying a photosensitive material onto the anti-reflective film to form a photoresist, exposing the photoresist to a light source to form an exposed photoresist, and developing the exposed photoresist to form desirable photoresist patterns. Thus, Jung teaches present inventions of claims 19-21.

8. Claims 16-21 are rejected under 35 U.S.C. 102(a) as being anticipated by Hwang (English abstract of KR 2003059970 A, provided by Korean Intellectual Property Office).

Hwang teaches an anti-reflective coating material composition and a method for forming pattern using the composition, and the composition contains a crosslinking agent of present Formula 2, a photo absorbent having present Formula 1, and a thermal

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acid generator of present Formula 4. Thus, the reference teaches present inventions of claims 16-21.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-3 and 5-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al ("A Novel Organic Bottom Anti-Reflective Coating Material for 193 nm Excimer Laser Lithography", Polymer 41 (2000) pg.6691-6694) in view of Pavelcheck et al (US 6,767,689 B2).

Hwang teaches a bottom anti-reflective coating composition for 193 nm excimer laser lithography containing polyvinyl phenol (as a UV absorber), present crosslinking agent of Formula 2, and present thermal acid generator of Formula 4 (see abstract and Fig.1). Hwang's polyvinyl phenol also teaches present adhesivity enhancer of Formula 1 as well. Hwang does not teach present light absorbing agent of Formula 3.

Pavelcheck teaches (col.2, lines 28-40) an antireflective coating composition (for use with 248 nm and 193 nm lithography) containing a thermal acid generator and a crosslinking component. Pavelcheck furthermore teaches (col.6, lines 32-51 and claim 12) the use of a polymer having deep UV chromophores (such as those containing anthracyl groups) in the antireflective coating composition for deep UV applications so that the polymer will absorb reflections in the deep UV range (see col.6, lines 33-49).

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As specific example of such polymer, Pavelcheck discloses (see Example 1) a copolymer of anthracene methyl methacrylate, methyl methacrylate and 2-hydroxyethyl methacrylate, which teaches present polymer of Formula 3. Based on Pavelchek's teaching, it would have been obvious to one skilled in the art to use Pavelchek's polymer of Example 1 in Hwang's anti-reflective coating composition, which is used in deep UV applications, in order to absorb reflections in the deep UV range as taught by Pavelcheck. Thus, Hwang in view of Pavelcheck render obvious present inventions of claims 1-3 and 5-18.

Double Patenting

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 16-21 are rejected on the ground of nonstatutory obviousness-type

double patenting as being unpatentable over claims 6-13 of U.S. Patent No. 7,205,089

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B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 6 of Pat.'089 teaches present light absorbing agent as well as present adhesivity enhancer of formula 1. Claim 7 of Pat.'089 teaches present thermal acid generator of formula 4. The R_2 group in Formula 3 of claim 6 of Pat.'089 can be C_1 alkyl group, and thus the crosslinking polymer of Formula 3 of claim 6 of Pat.'089 teaches present formula 2 of claim 18 (present R_2 being a *substituted* C_1 alkyl group). Claims 11-13 of Pat.'089 teaches present methods of claims 19-21.

13. Claims 16-21 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-7 and 9-11 of U.S. Patent No. 7,270,933 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 2 of Pat.'933 teaches present light absorbing agent as well as present adhesivity enhancer of formula 1. Claim 3 of Pat.'933 teaches present thermal acid generator of formula 4. The R_2 group in Formula 2 of claim 1 of Pat.'933 can be C_1 alkyl group, and thus the crosslinking agent of Formula 2 of claim 1 of Pat.'933 teaches present formula 2 of claim 18 (present R_2 being a C_1 alkyl group). Claims 9-11 of Pat.'933 teaches present methods of claims 19-21.

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Jung et al (US 2001/0049429 A1, which is equivalent to US 6,489,432)), Jung et al (US 2001/0043992 A1), Jung et al (US 2003/0118736 A1, which is equivalent to US 6,780,953), Jung et al (US 2002/0132183 A1) and Jung et al (US 6,368,768 B1).

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15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sin J. Lee/
Primary Examiner, Art Unit 1795
February 15, 2008